REMARKS

Claims 2-15 are currently pending in the application; with claims 4 and 5 being independent. Claims 1-10 were pending prior to the Office Action. In the current amendment, claim 1 has been cancelled. Claims 2-5 and 8-10 have been amended. New claims 11-15 have been added.

The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein. Applicant respectfully requests favorable consideration thereof in light of the amendments and comments contained herein, and earnestly seeks timely allowance of the pending claims.

Claim Rejections – 35 USC §102

The Examiner has rejected claims 1-4 under 35 U.S.C. 102 (b) as being anticipated by JP 11-113005 ("Nagahama"). This rejection is respectfully traversed.

Applicant has cancelled claim 1 and has amended claim 4. By amendment, claim 4 has become an independent claim. Applicant has amended claim 4 to recite an image pick-up apparatus comprising: an optical lens system; a solid-state image pick-up device that converts a light signal incident through the optical lens system into an electric signal, the solid-state image pick-up device comprising first pixels that are used to pick up a color image, a second pixel disposed in a predetermined region of the solid-state image pick-up device, the second pixel being used for distinguishing a light source type, first to third filters mounted on the first pixels, and a fourth filter for transmitting a light having at least a wavelength of 520 nm or 580 nm, the fourth filter being mounted on the second pixel; and a control unit that distinguishes a light source type based on (i) a signal charge output from a first pixel mounted with the first filter and (ii) a signal charge output from the second pixel, wherein the control unit automatically adjusts a white balance of a color pick-up image of the solid-state image pick-up device.

Nagahama merely discloses an image pick-up device including an image pick-up signal output part 5 including a detection section 2, an image quality adjustment signal output part 3, and an image quality controller 4 (paragraph [0007], fig. 1). The image pick-up signal output part 5 includes a photo-electric-conversion circuit 51, a correlation duplex sampling (CDS) circuit 52,

an auto gain controller (AGC) 53, and an A/D converter 54. Light from a photographic subject passes through photo-electric-conversion circuit 51, CDS 52, AGC 53, and A/D converter 54, and a digital image pick-up signal V1 is output from the A/D converter 54 (paragraph [0008], fig. 1).

The photo-electric-conversion circuit 51 of Nagahama includes CCD components. The photo-electric-conversion circuit 51 includes a real image area 51a and a protection-from-light area 51b (Fig. 2, paragraph [0009]). The real image area 51a is used to pick up an image.

In Nagahama, 20 filters 21-1 to 21-20 attached in the protection-from-light area 51b, and constitute the detection section 2 (Fig. 2, paragraph [0009]). The detection section 2 detects a brightness value over a wavelength of a light source. Photo-electric conversion of the light filtered through filters 21-1 to 21-20 is carried out by CCD components associated with the filters. A detection signal V2 is generated from the photo-electric conversion in the detection section 2 (paragraph [0010]). Using the detection signal V2, the light source is specified. For this purpose, CPU 32b compares the detection signal V2 with light source data in a memory 32a, to specify (determine) a light source (step S2 in Fig. 4; paragraph [0014]). A record R is obtained using the detection signal V2. The record R includes the light source name data D21, its brightness data D1-D20 from the 20 filters 21-1 to 21-20 of detection section 2, and color difference modification data D22 with coefficients A1, A2, and A3 (figs. 3 and 5, paragraphs [0014] and [0015]). The comparison between light source data in a memory 32a and the detection signal V2 is made based on a brightness value arrangement of brightness data D1 to D20 (in the record R) and a brightness distribution of the detection signal V2 (paragraph [0015]).

Hence, in Nagahama, light filtered by filters 21-1 to 21-20, is photoelectrically converted by CCD elements on the back side of the filters 21-1 to 21-20 and processed by CDS circuit 52, auto gain controller (AGC) 53, and A/D converter 54, to thereby obtain the detection signal V2 that is used to specify the light source (paragraphs [0010], [0015]). Thus, Nagahama determines a light source <u>only based on signal charges output from pixels disposed in the protection-from-light area 51b</u>. Nagahama does not use signal charge outputs from pixels disposed in the real image area 51a, to determining a light source type.

Hence, in Nagahama, a light source type is determined based only on signal charges

output from pixels disposed in the protection-from-light area 51b. Signal charge outputs from pixels disposed in the real image area 51a are not used to determine a light source type.

The protection-from-light area 51b of Nagahama does not include any pixels that are used to pick up a color image. In Nagahama, all pixels that are used to pick up a color image are located in the real image area 51a. As mentioned above, in Nagahama, a light source type is determined based only on signal charges output from pixels disposed in the protection-from-light area 51b. Therefore, in Nagahama, pixels used to determine a light source type (pixels in area 51b) are not used to pick up a color image. Also, in Nagahama, no pixels used to pick up a color image (pixels in area 51a) are used to determine a light source type.

Hence, with respect to claim 4 as currently amended, Nagahama fails to disclose, at least, "a solid-state image pick-up device [...] comprising first pixels that are used to pick up a color image, a second pixel disposed in a predetermined region of the solid-state image pick-up device, the second pixel being used for distinguishing a light source type [...]; and a control unit that distinguishes a light source type based on (i) a signal charge output from a first pixel mounted with the first filter and (ii) a signal charge output from the second pixel."

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. 102 (b) rejection of claim 4. Amended claims 2-3 depend from claim 4 and are allowable at least by virtue of their dependency.

Claim Rejections - 35 USC §103

The Examiner rejected claims 5-10 under 35 U.S.C. 103 (a) as being unpatentable over Nagahama in view of US 7,006,135 ("Ishimaru et al."). Applicant traverses this rejection.

Applicant respectfully submits the Examiner has failed to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, the Examiner has the burden of meeting the basic criterion that the prior art must teach or suggest all of the claim limitations.

Regarding this basic criterion, neither Nagahama nor Ishimaru et al. disclose a signal processing unit that separates a color signal output from the color image pick-up unit into a luminance signal and a color difference signal, the signal processing unit multiplying the color

difference signal by a color difference matrix, to carry out a color correction."

As described above in the arguments traversing the §102 rejection of claim 4, in Nagahama, image quality adjustment signal output part 3 receives a digital image pick-up signal V1 and a detection signal V2. The detector circuit 31 included in image quality adjustment signal output part 3 detects the detection signal V2 and the image pick-up signal V1, and outputs these signals to microcomputer 32. Based on the image pick-up signal V1 and the detection signal V2, the microcomputer 32 generates a gain-adjustment signal V3 and a color difference modification signal V4 for image quality adjustment, and outputs these signals to the image quality controller 4 (fig. 1, paragraph [0012]).

In Nagahama, the color difference modification signal V4 includes the record R that specifies the light source. Record R was obtained from detection signal V2. Record R of signal V4 includes the light source name data D21, brightness data D1-D20 from the 20 filters 21-1 to 21-20 of detection section 2, and color difference modification data D22 with coefficients A1, A2, and A3 (fig. 5, paragraphs [0014], [0015], [0016]).

In Nagahama, the image quality controller 4 includes a primary color separation matrix circuit 41, a white balance equalization circuit 42, a gamma correction circuit 43, and a color difference matrix circuit 44 (fig. 1, paragraph [0017]). The gain-adjustment signal V3 is received by the white balance equalization circuit 42, and the color difference modification signal V4 is received by the color difference matrix circuit 44 (fig. 1). The gamma correction circuit 43 carries out gamma correction of the R, G and B signals from the white balance equalization circuit 42, and outputs primary signals R3, G3, and B3 (fig. 1). The color difference matrix circuit 44 receives signals R3, G3, and B3, and the color difference modification signal V4.

In Nagahama, the color difference matrix circuit 44 adjusts color reproduction nature by generating color-difference-signals R-Y and B-Y. The color-difference-signal R-Y is obtained from primary signals R3, G3, and B3. The color-difference-signal B-Y is obtained from primary signals R3, G3, and B3 and signal V4. Color-difference-signals R-Y and B-Y are generated by integrating multipliers K1, K2, K3, K4, K5, K6, and using coefficients A1, A2 and A3 from signal V4, according to the following equations (paragraph [0018]):

$$R - Y = K1 \times R3 + K2 \times G3 + K3 \times B3$$

$B - Y = A1 \times K4 \times R3 + A2 \times K5 \times G3 + A3 \times K6 \times B3$. Multipliers K1, K2, K3, and K4 are supplied by the color difference matrix circuit 44 (paragraph [0018]). These equations lead to a matrix equation $\begin{pmatrix} R - Y \\ B - Y \end{pmatrix} = \begin{pmatrix} K1 & K2 & K3 \\ A1 \times K4 & A2 \times K5 & A3 \times K6 \end{pmatrix} \begin{pmatrix} R3 \\ G3 \\ B3 \end{pmatrix}$. Hence, Nagahama obtains a color difference signal $\begin{pmatrix} R - Y \\ B - Y \end{pmatrix}$ by multiplying a matrix $\begin{pmatrix} K1 & K2 & K3 \\ A1 \times K4 & A2 \times K5 & A3 \times K6 \end{pmatrix}$ with an RGB signal $\begin{pmatrix} R3 \\ G3 \\ B3 \end{pmatrix}$. Therefore, Nagahama merely teaches multiplying <u>an RGB signal by a matrix</u>.

Moreover, the matrix $\begin{pmatrix} K1 & K2 & K3 \\ A1 \times K4 & A2 \times K5 & A3 \times K6 \end{pmatrix}$ of Nagahama cannot be expressed as a multiplication of a color difference matrix and another matrix. That is because terms A1, A2, and A3 belong to the color difference modification signal V4, but multipliers K1, K2, K3, and K4 do not belong to the color difference modification signal V4 (paragraph [0018]). It is then impossible to separate the terms A1, A2, and A3 (color difference terms), from the terms K1, K2, K3, and K4 (which are not color difference terms) in the matrix $\begin{pmatrix} K1 & K2 & K3 \\ A1 \times K4 & A2 \times K5 & A3 \times K6 \end{pmatrix}$, to obtain a product of two matrices. Hence, the matrix $\begin{pmatrix} K1 & K2 & K3 \\ A1 \times K4 & A2 \times K5 & A3 \times K6 \end{pmatrix}$ cannot be expressed in terms of a color difference matrix.

Claim 5, on the other hand, teaches a signal processing unit that separates a color signal output from the color image pick-up unit into a luminance signal and a color difference signal, the signal processing unit <u>multiplying the color difference signal by a color difference matrix</u>, to carry out a color correction.

Nagahama does not multiply <u>a color difference signal by a color difference matrix</u>. Nagahama only multiplies <u>an RGB signal by a matrix, to obtain a color difference signal</u>. In

Nagahama, the color difference signal $\begin{pmatrix} R-Y \\ B-Y \end{pmatrix}$ is output (fig. 1). There is no color difference matrix in Nagahama that is multiplied with the color difference signal. Hence, Nagahama fails to teach or suggest all of the elements for claim 5.

Ishimaru et al. merely discloses a camera capable of white balance correction (WBC). The camera includes an image pickup optical system, an image sensor for receiving light from an object, a three-primary-color (3-color) detection section for detecting 3-color signals based on the image sensor output, a matrix processing section for calculating 2-color difference signals from the 3-color signals, a visible-light brightness detection section for detecting visible-light brightness by the output from the 3-color detection section or by a photometric section, an infrared-light detection section for detecting the lightness of infrared-light, and an artificial-light detection section for calculating the ratio of artificial light and natural-light. A correction range for performing the WBC is obtained based on the ratio of artificial-light and natural-light computed by the artificial-light detection section, and the WBC is performed when the 2-color difference signals are within the correction range (Abstract).

In Ishimaru et al., the matrix processing section 8 (fig. 2) separates a color signal output (R, G, and B) from an image sensor (CCD 3) into a brightness signal Y and color difference signals R-Y and B-Y (fig. 2, col. 5 lines 64-67, col. 4 line 63-col. 5 line 3). The brightness signal Y and the color difference signals R-Y and B-Y are then output (fig. 2).

While Ishimaru et al. discusses color difference signals, Ishimaru et al. does not teach or suggest a multiplication of a color difference signal by a color difference matrix, to carry out color correction. Color difference signals R-Y and B-Y in Ishimaru et al. are output without any multiplication by a color difference matrix. In fact, a color difference matrix for sunlight, or a color difference matrix for a specific light source other than the sunlight is not mentioned anywhere in Ishimaru et al. Hence, a signal processing unit multiplying a color difference signal by a color difference matrix, to carry out a color correction is not taught or suggested by Ishimaru et al. Therefore, Ishimaru et al. fails to teach or suggest all of the elements for claim 5.

Hence, with respect to claim 5 as currently amended, Nagahama and Ishimaru et al. fail to teach or suggest, at least, "a signal processing unit that separates a color signal output from the

color image pick-up unit into a luminance signal and a color difference signal, the signal processing unit multiplying the color difference signal by a color difference matrix, to carry out a color correction".

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. 103 (a) rejection of claim 5. Claims 6-10 depend from claim 5 and are allowable at least by virtue of their dependency.

Conclusion

In view of the above amendments and remarks, this application appears to be in condition for allowance and the Examiner is, therefore, requested to reexamine the application and pass the claims to issue.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Corina E. Tanasa, Limited Recognition No. L0292 under 37 CFR §11.9(b), at telephone number (703) 208-4003, located in the Washington, DC area, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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